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Faulkner et al.

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(54) **HIGH FIBER COUNT PRE-TERMINATED OPTICAL DISTRIBUTION ASSEMBLY**

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G02B 6/44 (2006.01)
G02B 6/38 (2006.01)

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(58) **Field of Classification Search**

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See application file for complete search history.

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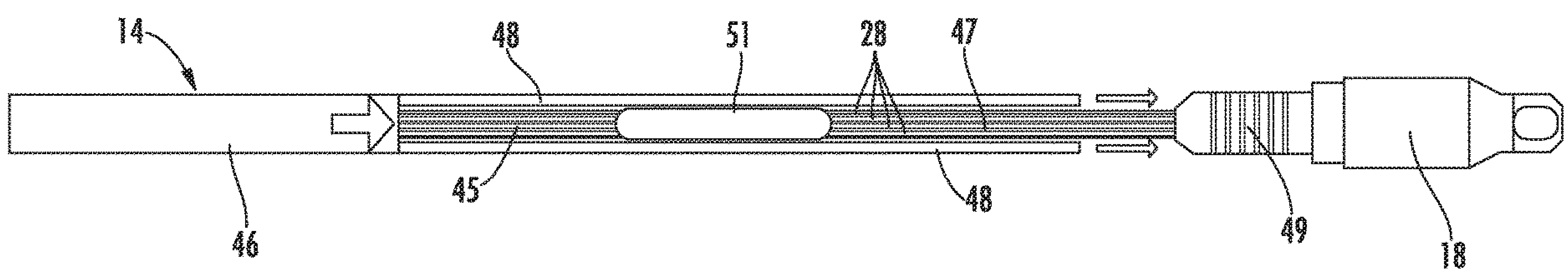
(57) **ABSTRACT**

Embodiments of a furcated optical fiber cable are provided. A main distribution cable has optical fibers surrounded by a cable jacket. The optical fibers are divided into at least two furcation legs. A furcation plug is located at a transition point between the main distribution cable and the at least two furcation legs. The furcation plug surrounds at least a portion of the main distribution cable and each of the at least two furcation legs. Optical connectors are provided for each of the at least two furcation legs, and each connector includes optical fibers that are spliced at a splice location to the optical fibers of the connector's respective furcation leg. The splice location is closer to the connector than to the furcation plug. A method of furcating an optical fiber cable and a pulling configuration for the furcated optical fiber cable are also provided.

8 Claims, 6 Drawing Sheets



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(60) Provisional application No. 62/525,970, filed on Jun. 28, 2017.

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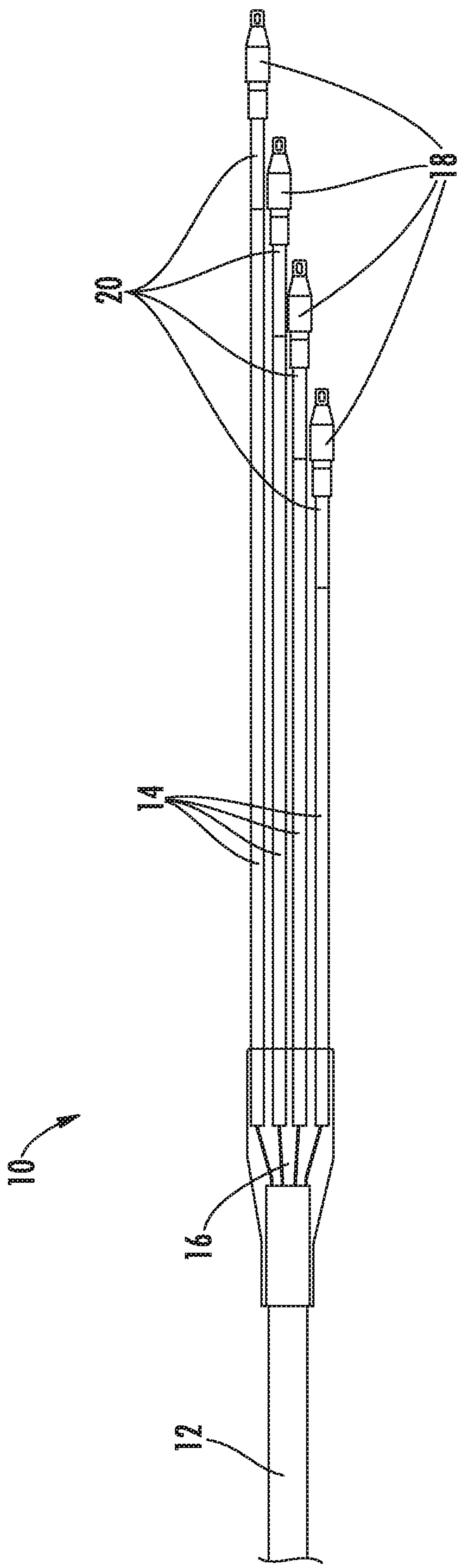

FIG. 1

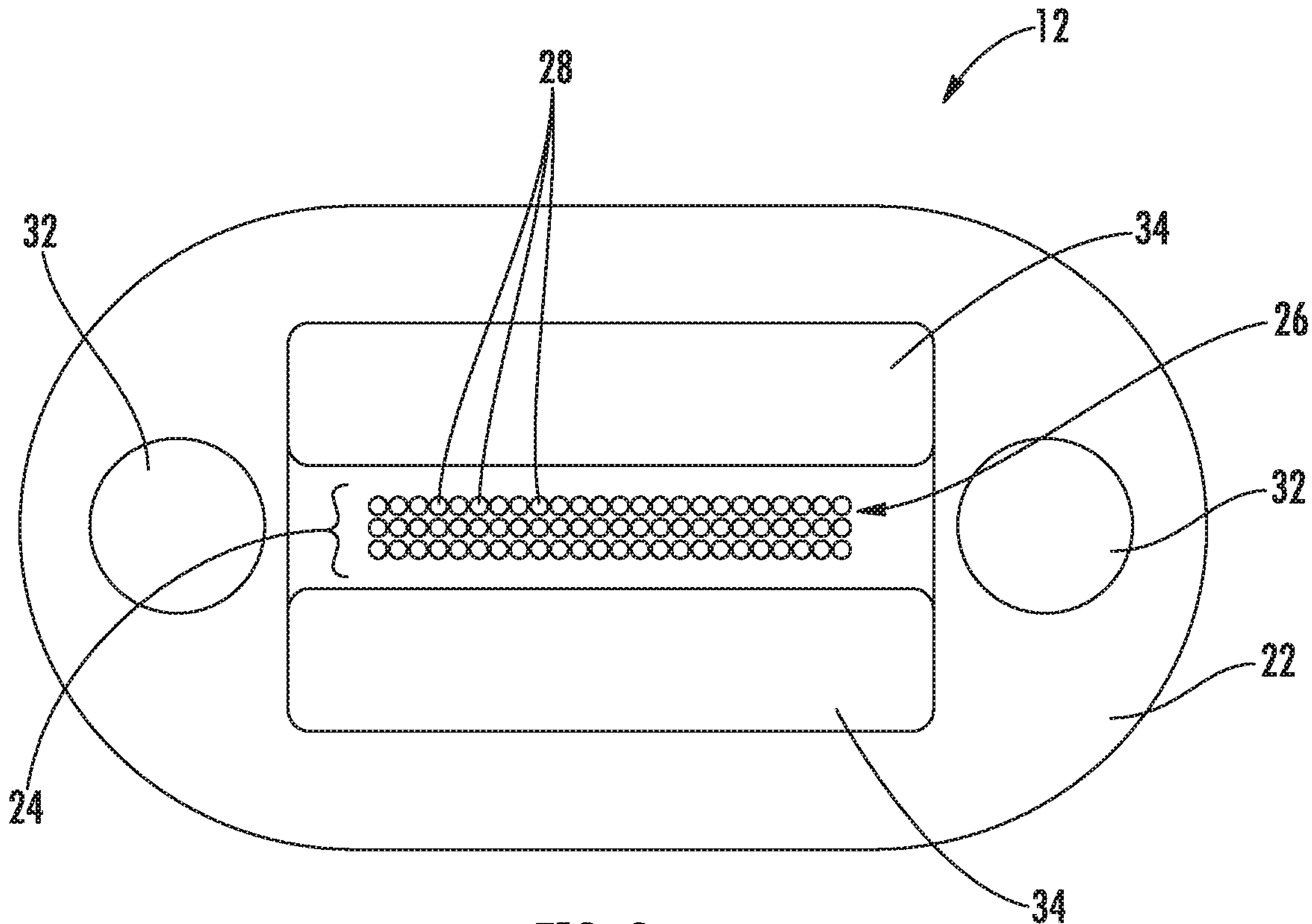

FIG. 2

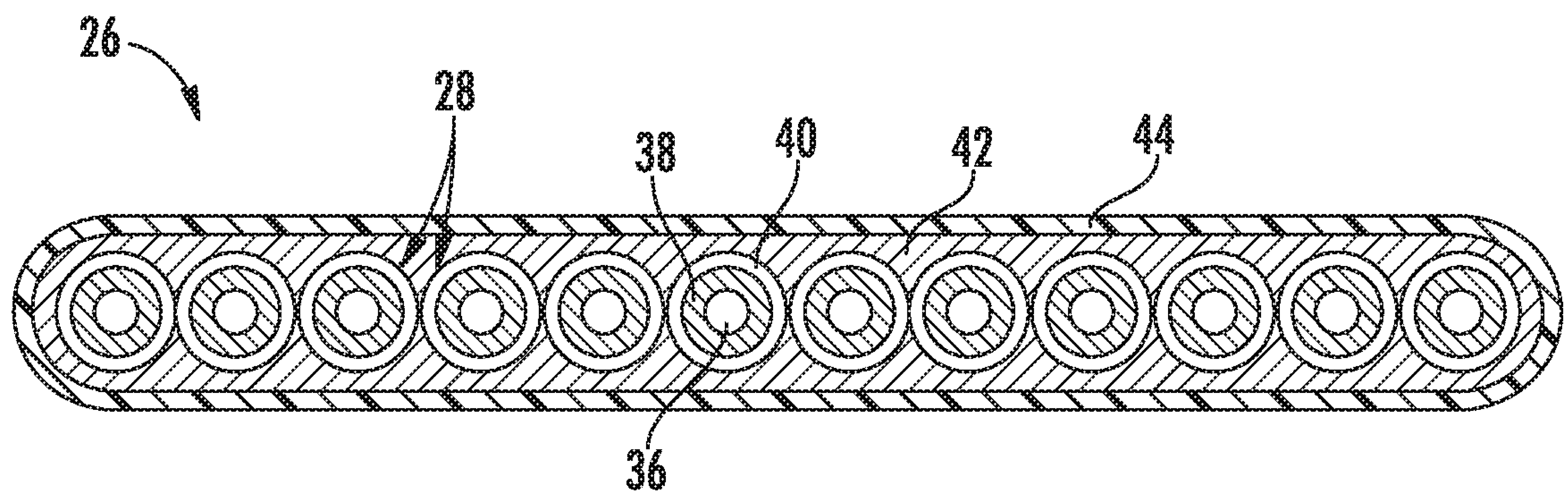

FIG. 3

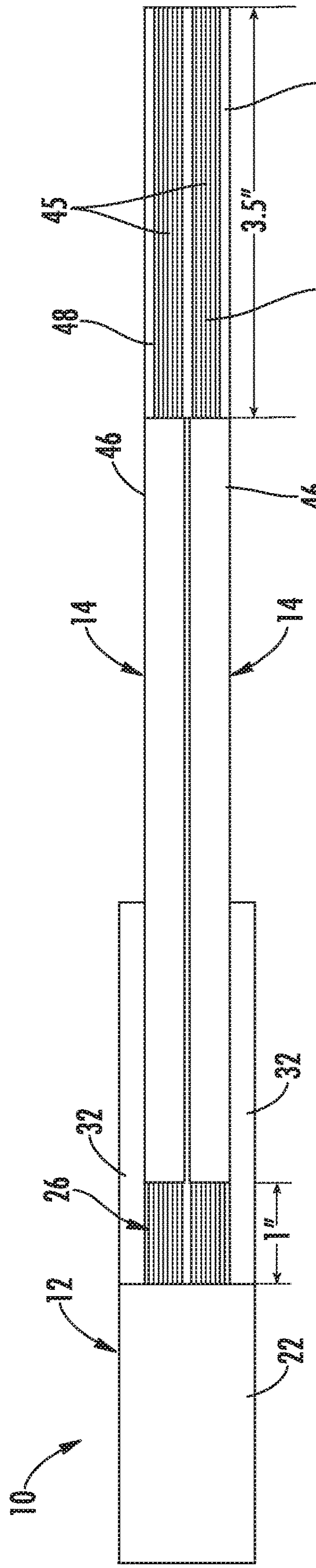

FIG. 4

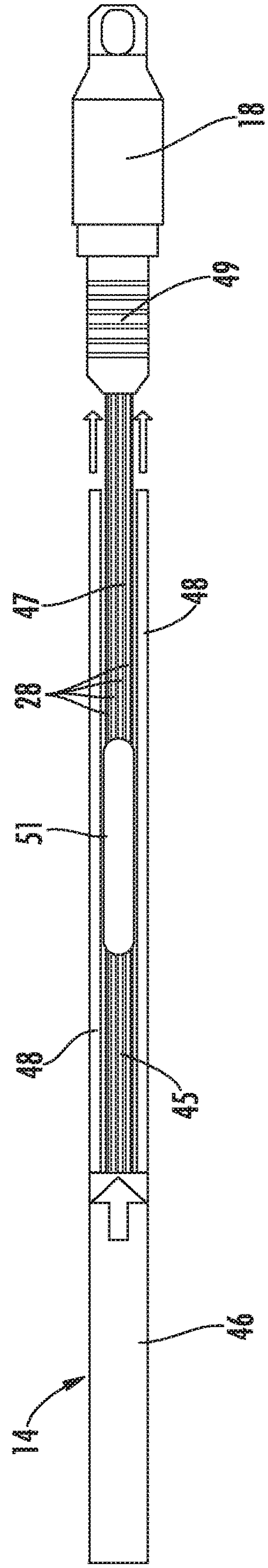

FIG. 5

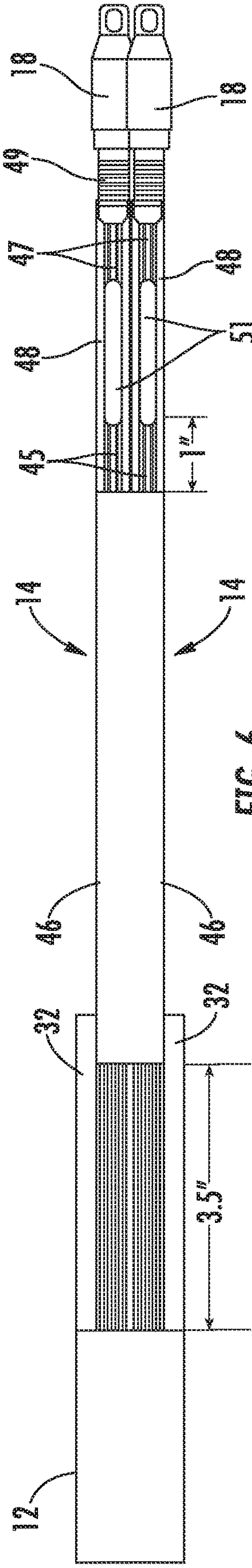

FIG. 6

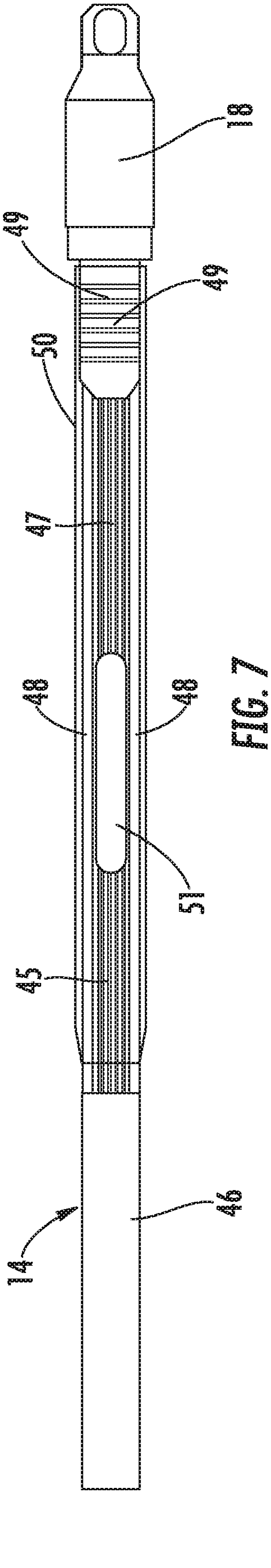
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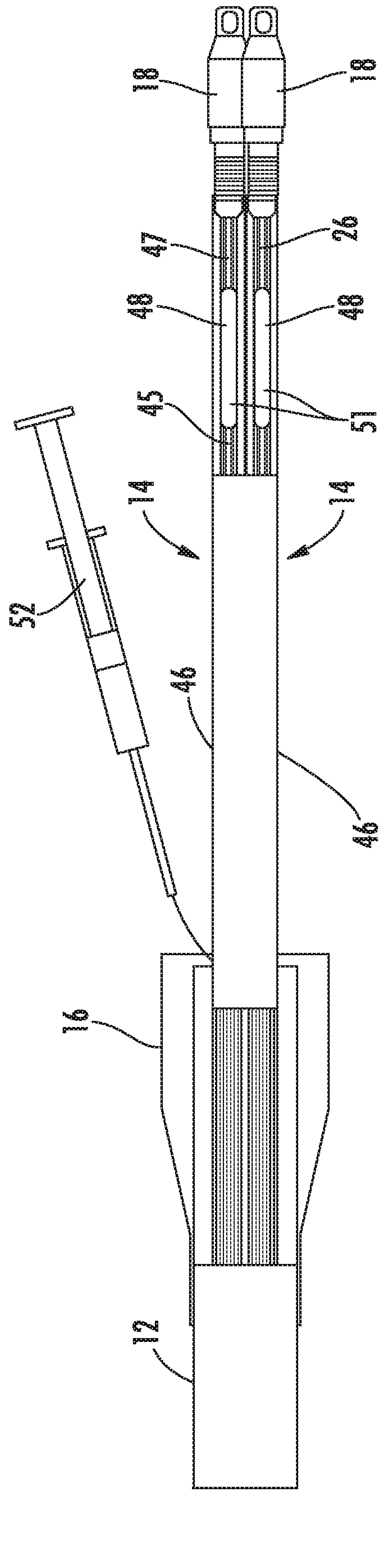
FIG. 7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16
12

FIG. 8

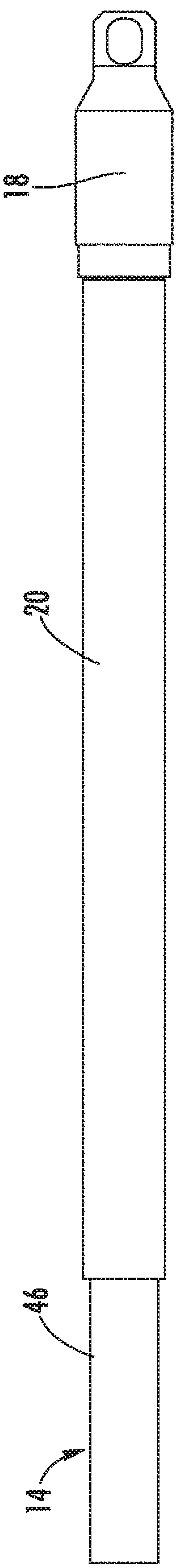

FIG. 9

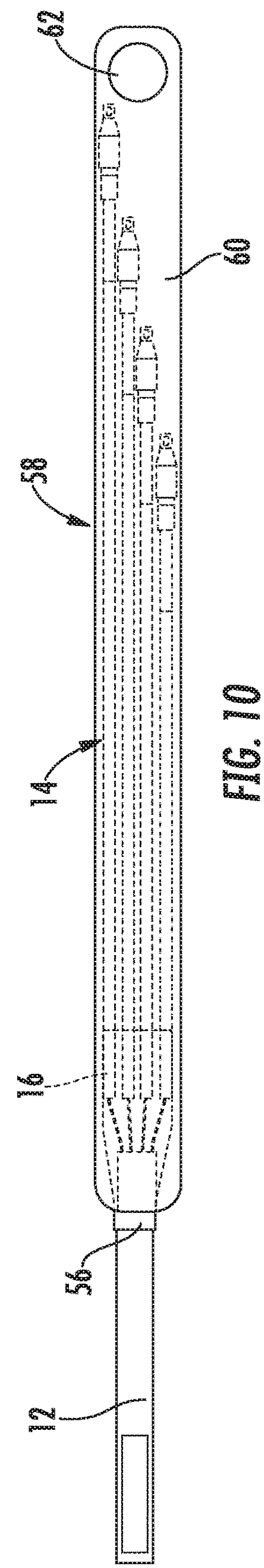

FIG. 10

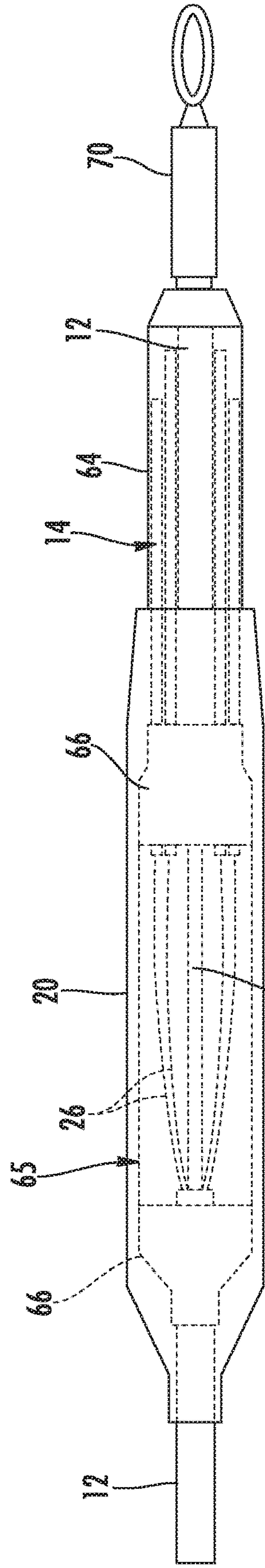

FIG. 11

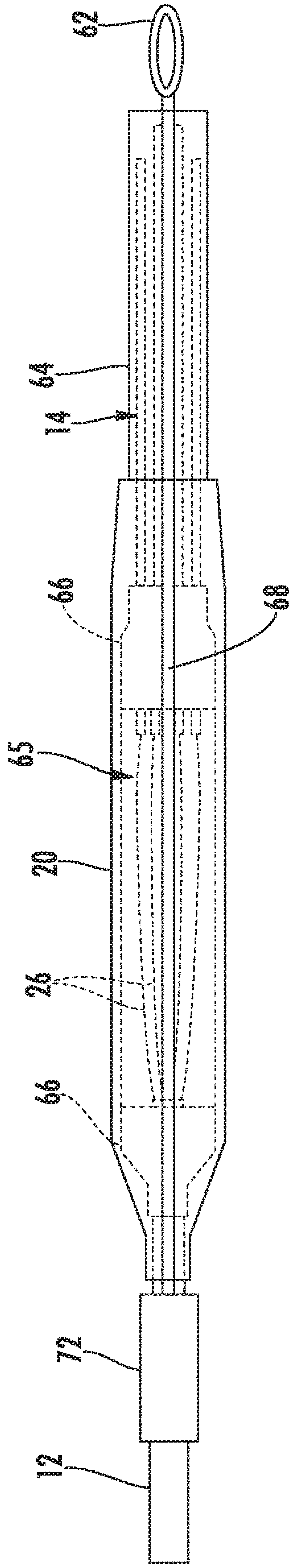

FIG. 12

HIGH FIBER COUNT PRE-TERMINATED OPTICAL DISTRIBUTION ASSEMBLY

PRIORITY APPLICATION

This application is a divisional of U.S. application Ser. No. 16/011,938, filed Jun. 19, 2018, which claims the benefit of U.S. Provisional Application No. 62/525,970, filed on Jun. 28, 2017, the content of which is relied upon and incorporated herein by reference in its entirety.

BACKGROUND

The disclosure relates generally to optical cables and more particularly to a furcated optical fiber cable. A main optical cable line can include many branch lines that divert a portion of the optical fibers of the main optical cable to end users. Some main optical cable lines are manufactured with branch lines located in predetermined locations in order to avoid having a technician splice on branch lines in the field, which typically is costly, time-consuming, and less accurate than can be accomplished in the manufacturing facility. In branching the optical fibers, vulnerabilities tend to be created in the protective jacket of the main optical cable line at the location of the branch, for example as a result of the opening in the cable jacket created to access the fibers to create the branch. These vulnerabilities are potential sources of mechanical and environmental damage to the underlying optical fibers.

SUMMARY

In one aspect, embodiments of an optical fiber cable are provided. The optical fiber cable includes a main distribution cable having a plurality of optical fibers surrounded by a cable jacket. Further the optical fiber cable includes at least two furcation legs into which the plurality of optical fibers are divided. The at least two furcation legs transition from the main distribution cable, and each of the at least two furcation legs extends from the distribution cable along a longitudinal axis. The optical fiber cable further includes a furcation plug located at a transition point between the main distribution cable and the at least two furcation legs. The furcation plug surrounds at least a portion of the main distribution cable and each of the at least two furcation legs. Also included in the optical fiber cable is an optical connector for each of the at least two furcation legs. Each connector includes optical fibers that are spliced at a splice location to the optical fibers of the connector's respective furcation leg. Moreover, for each of the at least two furcation legs, the splice location is closer to the connector than to the furcation plug as measured in a direction along the longitudinal axis of each furcation leg.

In another aspect, embodiments of a method of furcating an optical fiber cable are provided. The method includes a step of dividing a plurality of optical fibers from a main distribution cable into at least two furcation legs. Also, a jacket of each of the at least two furcation legs is slid towards the main distribution cable so as to expose at least a three-inch portion of the optical fibers in each of the at least two furcation legs. Further, optical fibers of a connector are spliced to the exposed portion of the optical fibers of each furcation leg. The jacket of each furcation leg is then slid toward the connector, and a furcation plug is placed at a location where the main distribution cable is divided into the at least two furcation legs. Finally, the exposed portion of the optical fibers of each furcation leg is covered.

In still another aspect, embodiments of a pulling configuration for a furcated optical fiber cable are provided. The pulling configuration includes a main distribution cable including a plurality of optical fibers surrounded by a cable jacket and at least two furcation legs into which the plurality of optical fibers are divided. The at least two furcation legs transition from the main distribution cable. Further, a furcation plug is located at a transition point between the main distribution cable and the at least two furcation legs. The furcation plug surrounds at least a portion of the main distribution cable and each of the at least two furcation legs. A pulling ring encircles the main distribution cable and is located on a side of the furcation plug opposite the furcation legs. A pulling mesh surrounds the at least two furcation legs, and a pulling loop is formed at an end of the pulling mesh. The pulling loop is mechanically linked to the main distribution cable via the pulling ring such that pulling forces on the pulling loop are primarily borne by the main distribution cable.

Additional features and advantages will be set forth in the detailed description that follows, and in part will be readily apparent to those skilled in the art from the description or recognized by practicing the embodiments as described in the written description and claims hereof, as well as the appended drawings.

It is to be understood that both the foregoing general description and the following detailed description are merely exemplary, and are intended to provide an overview or framework to understand the nature and character of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings are included to provide a further understanding and are incorporated in and constitute a part of this specification. The drawings illustrate one or more embodiment(s), and together with the description serve to explain principles and the operation of the various embodiments.

FIG. **1** depicts a furcated optical fiber cable, according to an exemplary embodiment.

FIG. **2** depicts a cross-sectional view of the main distribution cable portion of the furcated optical fiber cable, according to an exemplary embodiment.

FIG. **3** depicts an optical fiber ribbon usable in a furcated optical fiber cable, according to an exemplary embodiment.

FIG. **4** is a detailed view of a furcation location showing a distribution cable ribbon being split into two furcation legs in an initial step of a furcation method, according to an exemplary embodiment.

FIG. **5** is a detailed view showing sliding of a furcation leg jacket forward after a splice has been made, according to an exemplary embodiment.

FIG. **6** is a detailed view of the furcation legs and main distribution cable after the furcation jackets have been slid forward to meet the connectors, according to an exemplary embodiment.

FIG. **7** is a detailed view of a furcation leg after a heat shrink wrap has been applied around the splice and exposed optical fiber ribbons, according to an exemplary embodiment.

FIG. **8** is a detailed view of the furcation plug being sealed to the main distribution cable and the furcation legs, according to an exemplary embodiment.

FIG. **9** is a detailed view of an overmold applied around the heat shrink wrap of a furcation leg, according to an exemplary embodiment.

FIG. **10** depicts a first configuration for pulling a furcated optical fiber cable through ductwork, according to an exemplary embodiment.

FIG. **11** depicts a second configuration for pulling a furcated optical fiber cable through ductwork, according to an exemplary embodiment.

FIG. **12** depicts a third configuration for pulling a furcated optical fiber cable through ductwork, according to an exemplary embodiment.

DETAILED DESCRIPTION

Referring generally to the figures, various embodiments of a furcated optical fiber cable are depicted. In particular, the furcated optical fiber cable includes two or more furcation legs that are spliced near to the connector instead of near to the location of the furcation. In particular, each furcation leg includes a slidable jacket that can be moved to provide enough room for fusion splicing of the optical fiber or fibers to the optical fiber or fibers of the connector. The slidable jacket creates two sections of exposed fiber in which a first section is covered with a furcation plug and a second section is covered with an overmold and/or heat shrink wrap. Furcating and splicing the cable in this way lowers the overall profile of the cable. Indeed, as compared to previous furcated optical fiber cables, the presently disclosed optical fiber cable advantageously allows for smaller sections of cable disruption resulting from furcation. Additionally, the presently disclosed optical fiber cable is able to provide staggered connectors to facilitate pulling the cable in standard two inch ducts. Further, the presently disclosed optical fiber cable utilizes a short, rigid furcation plug that provides superior anchoring for high strength pulling grips. These and other advantages will be discussed below with reference to non-limiting, exemplary embodiments. Other modifications may become apparent to one of ordinary skill in the art upon consideration of the present disclosure, and such modifications are considered to be within the scope of the present disclosure.

With initial reference to FIG. **1**, an embodiment of a furcated optical fiber cable **10** is depicted. As can be seen, the furcated optical fiber cable **10** has a main distribution cable **12** from which four furcation legs **14** extend. While four furcation legs **14** are shown for illustrative purposes, in other embodiments, the main distribution cable **12** can be furcated into, e.g., from two to twelve or more furcation legs **14**. The furcation of the furcation legs **14** from the main distribution cable **12** is facilitated by a furcation plug **16**. The furcation plug **16** stabilizes and protects the location of furcation such that the interior of the main distribution cable **12** is not exposed to environmental hazards. As is also depicted in FIG. **1**, the furcation legs **14** have different lengths such that each leg is customized in length to cover the particular distance to the installation point. Generally, the furcation legs **14** are from three to six feet in length; however, in certain embodiments, the furcation legs are up to eighteen or twenty feet in length. In a particular embodiment, a furcated optical fiber cable **10** contains twelve furcation legs **14** that are staggered in length from three to six feet, e.g., each furcation leg **14** is three inches shorter than the successive furcation leg **14**. The ability to stagger the length of the furcation legs **14** decreases the overall profile of the furcated optical fiber cable **10**, which as will be discussed more fully below has advantages for pulling the cable **10** through ductwork.

Also, advantageously, each furcation leg **14** is connectorized, i.e., each furcation leg **14** is pre-terminated with a connector **18**. In embodiments, the connectors **18** are a multi-fiber, mechanical transfer ("MT") connector, such as the OptiTip® MT connector (available from Corning Incorporated, Corning, N.Y.). As will be discussed more fully below, the connectors **18** are spliced to the furcation leg **14** near the end of the furcation leg **14**, and the splices are protected, in part, with an overmold **20**. The connectors **18** allow the furcation legs **14** to be plugged into multiport terminals, splitters, etc. without requiring in-field termination and connectorization.

In order to facilitate discussion of the furcation process, the components of the main distribution cable **12** are discussed herein and depicted in FIG. **2**. In FIG. **2**, the main distribution cable **12** is depicted as an optical fiber ribbon cable; however, in other embodiments, the main distribution cable **12** is a loose tube cable. In particular, the main distribution cable **12** is depicted as an elongated or racetrack profile cross-section cable, such as RPX® Gel-Free Ribbon Cable (available from Corning Incorporated, Corning, N Y). The main distribution cable **12** includes an outer cable jacket, shown as outer cable jacket **22**. As will be generally understood, the interior of the cable jacket **22** defines an internal region within which the various cable components discussed herein are located.

In various embodiments, cable jacket **22** is formed from an extruded thermoplastic material. In various embodiments, cable jacket **22** may be a variety of materials used in cable manufacturing such as polyethylene, medium density polyethylene, polyvinyl chloride (PVC), polyvinylidene difluoride (PVDF), nylon, polyester or polycarbonate and their copolymers. In addition, the material of cable jacket **22** may include small quantities of other materials or fillers that provide different properties to the material of cable jacket **22**. For example, the material of cable jacket **22** may include materials that provide for coloring, UV/light blocking (e.g., carbon black), burn resistance/flame retardance, etc.

Contained within main distribution cable **12** is a stack **24** of optical fiber ribbons **26**. Each ribbon **26** includes multiple optical transmission elements or optical waveguides, shown as optical fibers **28**. As shown in FIG. **2**, main distribution cable **12** includes a single stack **24** of optical fiber ribbons **26**. In various embodiments, main distribution cable **12** includes at least two ribbons **26** within stack **24**, and each ribbon **26** supports from four to twenty-four optical fibers **28**. In the particular embodiment depicted in FIG. **2**, the stack **24** contains three ribbons **26** with twenty-four optical fibers **28** in each optical fiber ribbon **26**. However, in other embodiments, a different number of ribbons **26**, including more or less than shown in FIG. **2**, may be provided in the main distribution cable **12**. Additionally, in other embodiments, a different number of optical fibers **28**, including more or less than shown in FIG. **2**, may be provided within each ribbon **26**. Still further, in other embodiments, multiple stacks **24**, each included, e.g., in separate buffer tubes, are contained in the main distribution cable **12**.

In the embodiment shown, multiple strength members **32** are embedded in cable jacket **22** to provide structure and protection to the optical fibers **28** during and after installation (e.g., protection during handling, protection from the elements, protection from the environment, protection from vermin, etc.). In various embodiments, main distribution cable **12** includes two strength members **32** that are arranged on opposites sides of the main distribution cable **12**. Each strength member **32** may be any suitable axial strength member, such as a glass-reinforced plastic rod, steel rod/wire, etc. Main distribution cable **12** may include a variety of other components or layers, such as a metal armor layer, helically wrapped binders, circumferential constrictive thin-film binders, water blocking tape materials, water-blocking fiber materials, etc. In particular, in the embodiment shown, main distribution cable **12** includes water swellable tape **34** above and below the stack **24** of optical fiber ribbons **26**. Still further, the main distribution cable **12** can include one or more preferential tear feature and/or ripcord embedded in or underneath cable jacket **22**.

FIG. **3** depicts the construction of an exemplary embodiment of an optical fiber ribbon **26** such as might be carried in the main distribution cable **12** (shown in FIGS. **1** and **2**). As can be seen, the optical fiber ribbon **26** includes a plurality of optical fibers **28**. In the embodiment depicted, there are twelve optical fibers **28**. Each optical fiber **28** includes a glass core and cladding region **36** along which optical signals propagate. In particular, the core is surrounded by the cladding so as to substantially keep the optical signals within the core during transmission. The core and cladding region **36** is surrounded by a primary coating **38** and a secondary coating **40**. The dual layer coating, i.e., primary coating **38** and secondary coating **40**, provide enhanced protection for the core and cladding region **36** against microbending-induced attenuation. In embodiments, each optical fiber **28** in the optical fiber ribbon **26** has a different color ink layer applied to the secondary coating **40** such that the optical fibers **28** can be discerned from each other during installation, splicing, repair, etc.

A polymeric matrix **42** holds the optical fibers **28** together in a parallel arrangement within the optical fiber ribbon **26**. Surrounding the polymeric matrix **42** is an outer coating **44**. In embodiments, ribbon identification information is printed on to polymeric matrix **42**, and the outer coating **44** helps to preserve the printing from smudging, rubbing off, abrasion, etc.

Having described the main distribution cable **12** and its components, the process for furcating the optical fiber cable **10** will now be discussed with reference to FIG. **4**. For clarity and ease of illustration, two furcation legs **14** are shown in the embodiment of FIG. **4**; however, the process depicted is equally applicable to furcated optical fiber cables **10** having more than two furcation legs **14**. Initially, the cable jacket **22** is stripped from the main distribution cable **12**, revealing the optical fiber ribbons **26**. Further, the optical fiber ribbons **26** are able to be further divided into furcation legs. For example, the optical fiber ribbons **26** depicted in FIG. **2** contain twenty-four optical fibers **28**. In embodiments and as shown in FIG. **4**, during furcation, each twenty-four fiber optical fiber ribbon **26** ("large optical fiber ribbon **26**") is divided into two twelve fiber ribbons **45** ("small optical fiber ribbons **45**") for each furcation leg **14**.

During the step of stripping the cable jacket **22**, sections of the strength members **32** of the main distribution cable are left exposed as well, which as will be discussed more fully below help to support the furcation location. In embodiments, three to five inches of the strength members **32** are left exposed after the initial stripping step.

After stripping the main distribution cable **12**, a furcation leg jacket **46** is then pushed over each of the exposed small optical fiber ribbons **45**. As can be seen in FIG. **4**, the furcation leg jacket **46** also includes strength members **48**, which are in part exposed so as to support the splice region. The furcation leg jacket **46** is of a length so that between one half and two inches of the small optical fiber ribbons **45** remain exposed at the end of the furcation leg **14** by the main distribution cable **12**. Additionally, between three and five inches of the small optical fiber ribbons **45** remain exposed for performing the splice to the connectors **18** as shown in FIG. **5**.

The splice to the connectors **18** is performed via mass fusion splicing. More specifically, the connectors **18** have their own optical fiber ribbon **47** extending from a crimp body **49** of the connector **18**. The optical fiber ribbon **47** of the connectors **18** are spliced to the small optical fiber ribbons **45** of the furcation legs **14**. In order to perform this splice, the individual optical fibers **28** are exposed by stripping the primary coating **38**, secondary coating **40**, polymeric matrix **42**, and outer coating **44** from the optical fibers **28** (as shown in FIG. **3**). As shown on a single furcation leg **14** in FIG. **5**, the optical fibers **28** (also stripped) of the connectors **18** are then fused to the optical fibers **28** of the furcation leg **14** to form a splice **51** using a mass fusion splicer. Generally, mass fusion splicers feature precision cleaving, aligning, and positioning tools such that the ends of the optical fibers **28** are able to be brought into close proximity and fused together using, e.g., an electric arc, laser, gas flame, etc., to produce connections having losses of less than 0.03 dB. In embodiments, the splice **51** is located near to the connectors **18**. That is, when the furcation leg **14** is unfurled or laid out along its longitudinal axis, the splice **51** is located closer to the connectors **18** than to the furcation plug **16** (as shown, e.g., in FIG. **8**). In a particular embodiment, each furcation leg **14** is spliced within ten inches of a downstream end of its respective connector **18**. In a more particular embodiment, each furcation leg **14** is spliced within five inches of the downstream end of its respective connector **18**.

Immediately after the splicing is performed, a splice protection tube or sleeve may be slid over the splice region of the optical fibers **28**. The splice protection tube is made of an inner tube and a strength member contained inside a heat shrink wrap. Once the inner tube is placed over the splice region, the heat shrink wrap is heated to seal the inner tube and strength member in place. In this way, the spliced optical fiber ribbon **26** is able to be safely handled with a substantially reduced risk of damage to the optical fibers **28**.

Once the splice protection tube is in place, the furcation leg jacket **46** is pushed forward (as illustrated by the arrows in FIG. **5**) toward the connector **18** until the strength members **48** contact the end of the connector **18** as shown in FIG. **6**. More specifically, the strength members **48** are inserted into the crimp body **49** of the connector **18**. In embodiments and as shown in FIG. **7**, a heat shrink wrap **50** is placed around the splice region, including the strength members **48**, and heat shrunk into place as an initial layer of environmental protection for the splice region. In embodiments, superabsorbent polymer powder and/or water swellable yarn are contained inside the heat shrink wrap **50** to prevent water from reaching the connector **18**.

Next, the furcation plug **16** is molded, formed, or otherwise placed around the location of furcation as shown in FIG. **8**. In an embodiment, the furcation plug **16** is an aluminum tube with a heat shrink wrap. In such embodiments, the aluminum tube furcation plug **16** is sealed with a sealant **52**, such as a polyurethane, epoxy, urethane, or other hardenable resin (e.g., LOCTI 3360, available from Henkel Corporation). In another embodiment, the furcation plug **16** is a rigid, molded resin. In FIG. **8**, the furcation plug **16** is placed around the exposed portion of the optical fiber ribbons **26** near the main distribution cable **12** (the exposed portion being larger as a result of the sliding forward of the furcation leg jacket **46**) and around the strength members **32** of the main distribution cable **12**. As mentioned above, the strength members **32** provide structure and protection for main distribution cable **12** at the location of the furcation plug **16**.

In the embodiment shown in FIG. **9**, the furcation legs **14** are also provided with the overmold **20** to further protect the splice region. Thus, the overmold **20** is located from directly behind the connectors **18** to from three to five inches or more behind the location of the splice. In embodiments, the overmold **20** is a polyurethane composition capable of protecting the splice region from mechanical stresses and enhancing the environmental resistance of the furcated optical fiber cable **10**.

Advantageously, embodiments of the presently disclosed furcated optical fiber cable **10** enable outdoor operation and can be used with fiber counts up to or exceeding **144** fibers. In particular, the furcated optical fiber cable **10** is constructed of outdoor rated materials that, e.g., include mildewcides and are capable of withstanding extreme cold (e.g., as low as −40° C.) and extreme hot temperatures (e.g., up to 80° C.). Another advantage of the furcated optical fiber cable **10** is that the splice regions near the connectors **18** maintain flexibility, which aids in the installation process. Additionally, because the furcated optical fiber cable **10** utilizes a short, rigid furcation plug **16** at the location of furcation, use of a pulling grip that can withstand forces greater than the cable installation rating of around 600 pounds is possible.

In particular, FIGS. **10-12** depict embodiments of how the furcated optical fiber cable **10** can be configured for pulling through a duct using a pulling attachment **58**. In the embodiment shown in FIG. **10**, a pulling ring **56** encircles the main distribution cable **12**. A high-tensile strength mesh fabric, or pulling mesh **60**, is attached to the pulling ring **56** and surrounds the furcation legs **14** and furcation plug **16**. At the opposite end, the pulling mesh **60** is knotted into a pulling loop **62**. Advantageously, the furcated optical fiber cable **10** is able to be used with such existing pulling attachments **58**. Such pulling attachments **58** are able to easily be put together and removed in the field without any special tools.

Referring now to FIG. **11**, the main distribution cable **12** is stripped along a section and the optical fiber ribbons **26** are exposed. The furcation legs **14** are spliced to the exposed optical fiber ribbons **26** in the stripped section, and a protective sleeve **65** is position around the splice region. After the stripped section, the main distribution cable **12** continues for the purposes of installation, and as part of the installation, the end section of the main distribution cable **12** is removed. In particular, the central strength member or members **32** of the main distribution cable **12** are used to pull the furcated optical fiber cable **10** through ductwork.

In furtherance of this goal, the end section of the main distribution cable **12** and the exposed optical fiber ribbons **26** are contained in a corrugated protective tube **64**. A heat shrink wrap **66** is then applied over at least a part of the protective sleeve **65** and over at least part of the corrugated protective tube **64**. A second heat shrink wrap **66** is placed over at least a part of the other end of the protective sleeve **65** and at least a part of the main distribution cable **12**. An overmold **20** is then applied over both heat shrink wraps **66**, over the protective sleeve **65**, and over at least a portion of the corrugated protective tube **64**. A pulling grip **70** is attached to the end of the main distribution cable **12** or the corrugated protective tube **64**. In an embodiment, the pulling grip **70** is a wire mesh sleeve that constricts around the main distribution cable **12** when a tensile force is applied.

Using the embodiment depicted in FIG. **11**, the main distribution cable **12** is able to be pulled through an installations ductwork with commonly known cable pulling grips and methods. Additionally, the installer is able to use the installer's own pulling grip for installation. Also, the strength member or members **32** of the main distribution cable **12** carry the load of the cable per currently performed processes.

Referring now to FIG. **12**, another embodiment is provided in which the furcation legs **14** are contained in a corrugated protective tube **64**, similar to the previous embodiment. Also like the previous embodiment, a section of the main distribution cable **12** is stripped to expose the optical fiber ribbons **26** for splicing within a protective sleeve **65**. Further, the protective sleeve **65** and the corrugated protective tube **64** are covered with a heat shrink wrap **66** and an overmold **20**. However, unlike the previous embodiment, the main distribution cable **12** ends at the stripped section such that the central strength member **32** does not continue forward. In order to provide a mechanical link to the main distribution cable **12**, a pulling plug **72**, such as an epoxy plug, is provided behind the overmold **20**, and a pulling wire **68**, such as mule tape, connects the pulling ring **56** to the pulling loop **62**, which in embodiments is a knot formed from the pulling wire **68**. Advantageously, this embodiment provides a slimmer overall design for pulling through ductwork.

Unless otherwise expressly stated, it is in no way intended that any method set forth herein be construed as requiring that its steps be performed in a specific order. Accordingly, where a method claim does not actually recite an order to be followed by its steps or it is not otherwise specifically stated in the claims or descriptions that the steps are to be limited to a specific order, it is in no way intended that any particular order be inferred. In addition, as used herein, the article "a" is intended to include one or more than one component or element, and is not intended to be construed as meaning only one.

It will be apparent to those skilled in the art that various modifications and variations can be made without departing from the spirit or scope of the disclosed embodiments. Since modifications, combinations, sub-combinations and variations of the disclosed embodiments incorporating the spirit and substance of the embodiments may occur to persons skilled in the art, the disclosed embodiments should be construed to include everything within the scope of the appended claims and their equivalents.

What is claimed is:

1. A method of furcating an optical fiber cable, comprising the steps of:
- dividing a plurality of optical fibers from a main distribution cable into at least two furcation legs;
- pushing a furcation jacket over each of the at least two furcation legs;
- sliding the furcation jacket of each of the at least two furcation legs towards the main distribution cable so as to expose at least a three-inch portion of the optical fibers in each of the at least two furcation legs;
- splicing optical fibers of a connector to the exposed portion of the optical fibers of each furcation leg;
- sliding the furcation jacket of each furcation leg toward the connector;
- placing a furcation plug at a location where the main distribution cable is divided into the at least two furcation legs; and
- covering the exposed portion of the optical fibers of each furcation leg.

2. The method of claim **1**, wherein the furcation jacket of each of the at least two furcation legs comprises one or more strength members and wherein the step of sliding the furcation jacket of each furcation leg toward the connector further comprises sliding the furcation jacket of each furcation leg toward the connector until the one or more strength members contacts the connector.

3. The method of claim **1**, wherein the step of covering the exposed portion of the optical fibers of each furcation leg further comprises covering the exposed portion of the optical fibers of each furcation leg with a heat shrink wrap.

4. The method of claim **1**, wherein the step of covering the exposed portion of the optical fibers of each furcation leg further comprises covering the exposed portion of the optical fibers of each furcation leg with an overmold.

5. The method of claim **1**, wherein the step of splicing a connector to the exposed portion of the optical fibers of each furcation leg is performed at a location that is nearer to the connector of each furcation leg than to the furcation plug.

6. The method of claim **1**, wherein the step of dividing a plurality of optical fibers from a main distribution cable into at least two furcation legs further comprises dividing from 72 to 144 optical fibers from the main distribution cable into the at least two furcation legs.

7. The method of claim **1**, further comprising the step of:

sealing the furcation plug to the main distribution cable and to each of the at least two furcation legs with a urethane sealant.

8. A pulling configuration for a furcated optical fiber cable, comprising:

a main distribution cable including a plurality of optical fibers surrounded by a cable jacket;

at least two furcation legs into which the plurality of optical fibers are divided, the at least two furcation legs transitioning from the main distribution cable;

a furcation plug located at a transition point between the main distribution cable and the at least two furcation legs, the furcation plug surrounding at least a portion of the main distribution cable and each of the at least two furcation legs;

a pulling ring encircling the main distribution cable and located on a side of the furcation plug opposite the furcation legs;

a pulling mesh surrounding the at least two furcation legs; and

a pulling loop formed at an end of the pulling mesh;

wherein the pulling loop is mechanically linked to the main distribution cable via the pulling ring such that pulling forces on the pulling loop are primarily borne by the main distribution cable.

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